CR-139223

ERTS TYPE I REPORT (July 3, 1974)

A. TITLE: Multispectral Signatures in Relation to Ground Control Signature Using Nested Sampling Approach.

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E. PERIOD: May 3, 1974 - July 3, 1974

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F. ABSTRACT

Study of the serpentine areas of the San Francisco Peninsula has been extended, analysed and partially evaluated. Results from this study have been encouraging. Correlation between reflectances calculated from the satellite measurements and reflectances measured in the field have been high. The spectra of the serpentine species has been found sufficiently unique to enable discrimination of the areas from ERTS. A parallel study of an area of semi consolidated sandstones near Livermore was also carried out, with similar results to the serpentine study, but again with sufficiently unique signatures.

In order to enable the evaluation of studies of areas involving vegetation coverage to be made more rigorous, a botanist has been included in the group. Results of a study of the biomass, species composition and vigour of the Stanford grasslands area are presented. Correlations of their results with concurrent measurements of the reflectivity of the grass canopy are being performed.

The tape-reading and classification program, RIPPER, has been thoroughly tested and evaluated. Modifications to the program to increase efficiency of core storage and accelerate the clustering algorithm are being carried out.

G. PROBLEMS

1. Approval of the no-cost time extension for 5 months has not yet been received. This extension is required to complete the work statement.

H. ACCOMPLISHMENTS

1. Field Data Collection

Field Date	Grass Condition
May 5	Green with seed heads.
May 10	Patchily green/dead.
May 15, 21, 22	Biomass study - grass sampled.
May 23	Mainly dead.

On each date (excluding Biomass days) the Stanford grassland (3-mile) transect was measured.

2. Biomass Study

a. Species identifications were made and photography completed.

b. Correlation coefficients were evaluated for both reflectances and normalized reflectances ($\frac{\text{Reflectance 7}}{\text{Reflectance 4}}$ which removes shadowing and slope effects.)

3. Soils and Rock Type Maps

Completed.

4. Serpentine/Grass Cover Studies

Completed.

5. Computer Software Development

a. New clustering algorithm developed and tested.

b. Clustering search made developed many ground-measured reflectances.

6. Hardware Development - Airborne

Proceeding, with delays because of procurement of sample-and-hold logic.

I. SUITABILITY OF ERTS DATA

No developments. Data good quality.

J. SIGNIFICANT RESULTS

1. Detection of mineralized area from ERTS CCT data

In a cooperative study with USGS personnel, we have been able to detect a 1.5 by 1 mile anomaly on ERTS CCT data, in the pine-covered mountains of western Nevada. This anomalous area is about 3-5 times larger than that of the known geobotanical anomaly which lies centrally within our area. The site has been studied by us on the ground and bi-directional reflectances (relative to $BaSO_4$ obtained for 40 trees, using both in-vivo techniques (similar to cherry picker operations) and field determinations of cut branches.

The anomaly can be seen best by color transparencies made from 5/4, 6/4 and 7/4 ratioed digital data, the 3 ratios each being coded by one of 3 colors (blue, green and red).

This part of the study is proceeding.

K. NEXT PERIOD

1. Completion of reflectance studies.

2. Airborne system development.

L. PUBLISHED MATTERIALS

None.

M. RECOMMENDATIONS

None.

N. CHANGES IN STANDING ORDER FORMS

None.

O. ACCESSION LIST FOR ERTS IMAGERY/TAPES OVER STANFORD

Enclosed.

P. DATA REQUEST FORMS SUBMITTED

None.

Q. MAILING LIST

At end of report.

TABLE 01. ERTS IMAGES ACQUIRED OVER STANFORD UNIVERSITY TEST AREA

	OBSERVATION ID	FIELD DATA	MICROFILM ROLL NO.	DATE ACQUIRED	CLOUD COVER	ORBIT NUMBER	PRINCIPAL POINT (C) OF IMAGE LAT.	PRINCIPAL POINT (C) OF IMAGE LONG.	SUN AZIM	SUN ELEV	(R=REQUESTED) PRODUCTS RECD. AT STANFORD M S B7	(R=REQUESTED) PRODUCTS RECD. AT STANFORD P M9
	(D)											
1.	1003-18175	-	10001/0126/7	07/26/72	10	42	3805N	12146W	118.7	58.7	4 4 -	2 R
2.	1021-18172	-	10001/1226	08/13/72	0	293	3724N	12145W	124.5	55.8	R 8 R	R -
3.	1039-18172	-	10002/0074	08/31/72	0	544	3725N	12150W	132.5	51.9	4 2 R	R -
4.	1057-18172	-	10002/0598	09/18/72	20	795	3721N	12149W	140.2	47.1	R R R	R -
5.	1075-18173	-	10004/0236	10/06/72	0	1046	3729N	12144W	146.8	41.6	4 8 R	2 4
6.	1093-NO FRAMES TAKEN			10/21/72	-	1297			152.	35.	- - -	- -
7.	1111-18181	-	10004/1570	11/11/72	60	1548	3715N	12153W	153.9	30.9	4 8 -	2 -
8.	1129-18181	-	10005/0498	11/29/72	20	1799	3725N	12150W	154.6	26.7	4 8 -	2 -
9.	1147-18181	-	10006/0333	12/17/72	90	2050	3718N	12151W	153.4	24.5	- - -	- -
10.	1165-18175	-	10006/0898	01/04/73	10	2301	3724N	12146W	151.1	24.2	4 8 -	2 R
11.	1183-18175	-	10007/0170	01/22/73	20	2552	3732N	12146W	148.2	26.3	4 8 R	2 4
12.	1201-18181	-	10007/0782	02/09/73	80	2803	3725N	12151W	144.9	30.5	- - -	- -
13.	1219-18182	-	10008/0440	02/27/73	100	3054	3726N	12156W	141.6	36.3	- - -	- -
14.	1237-18183	-	10009/0470	03/17/73	40	3305	3727N	12200W	138.1	42.8	4 8 -	2 -
15.	1255-18183	-	10009/1329	04/04/73	0	3556	3730N	12201W	134.2	49.4	8 4 -	1 4
16.	1273-18183	-	10010/0613	04/22/73	0	3807	3726N	12201W	129.4	55.2	4 8 -	2 4
17.	1291-18182	F	10010/1539	05/10/73	0	4058	3731N	12201W	123.3	59.6	8 4 -	1 4
18.	1309-18181	F		05/28/73			3735N	12201W	117.0	61.0	8 4 -	2 R
19.	1327-18180	F		06/15/73			3730N	12153W	113.0	62.0	4 8 -	2 R
20.	1345-18174	F	10012/1181	07/03/73	30	4811	3725N	12202W	112.5	61.6	4 8 -	2 R
21.	1363-18173	F	10013/0135	07/21/73	30	5062	3725N	12202W	115.0	59.0	4 8 -	2 R
22.	1381-18172	R	10013/1276	08/08/73	50	5313	3721N	12203W	122.0	56.0	- - -	- -
23.	1399-18170	R		08/26/73		5564	3726N	12201W	129.0	52.0	- 8 -	2 4
24.	1417-18164	-		09/13/73			3725N	12158W	137.9	48.0	4 8 -	2 -
25.	1435	-		10/01/73							- - -	- -
26.	1453	F		10/19/73							- - -	- -
27.	1471-	-		11/06/73								
28.	1489-18152	F	10018/0397	11/24/73	30	6819	3727N	12151W	153.9	27.5		
29.	1507-	-		12/12/73 Rain								
30.	1525-18145 V.Good	F	10019/0697	12/30/73 Clear	10	7321	3723N	12155W	151.0	23.0		
31.	1543-18141		10020/0371	1/17/74 Cloud	100	7572	3732N	12150W	148.0	25.0		
32.	1561-18133			2/04/74 Foggy (Good except SU)			3729N	12145W	144.0	28.0		
33.	1579-18131	F		2/22/74 OK (SU)			3733N	12147W	141.0	33.0		
				3/12/74 Cloudy								
34.	1597-											
35.	1615-											
36.	1633-			4/17/74 No Good								
37.	1651-18114	F		5/05/74 Patchy, but OK								